UNIVERSITAT DE BARCELONA

UNIVERSITAT POLITÈCNICA DE CATALUNYA

# Aplicació i anàlisi de l'eficiència de sistemes de climatització solar en un habitatge

## ANNEXOS

**Autor: Marc Gasulla Ramon**
**Director: José Miguel Asensi López**
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Màsters Universitaris

**Màster Interuniversitari UB-UPC d'Enginyeria en Energia**

# Sumari de continguts

ANNEX 1 – RESULTATS PARCIALS DEL CÀLCUL DE LA CÀRREGA TÈRMICA ..... 3
ANNEX 2 – IRRADIÀNCIA MENSUAL SEGONS L'ORIENTACIÓ ..... 8
ANNEX 3 – CONSUM D'AIGUA CALENTA SEGONS EL TIPUS D'EDIFICI ..... 9
ANNEX 4 – DADES TÈCNIQUES CAPTADOR UNISOL PLUS ..... 10
ANNEX 5 – DADES TÈCNIQUES CAPTADOR VIESSMANN VITOSOL 200-T ..... 11
ANNEX 6 – PRESSUPOST D'INSTAL·LACIÓ DE TERRA RADIANT ..... 12
ANNEX 7 – TAULES DE CAPACITAT DE LA BOMBA DE CALOR AIRE-AIRE ..... 13
ANNEX 8 – TAULES DE CAPACITAT DE LA BOMBA DE CALOR AIRE-AIGUA ..... 15
ANNEX 9 – CARACTERÍSTIQUES TÈCNIQUES DE RADIADORS DE BAIXA TEMPERATURA ..... 17
ANNEX 10 – DIMENSIONAT PER A COBERTURA SOLAR COMPLETA (CRITERI DESFAVORABLE) ..... 19
ANNEX 11 – DIMENSIONAT PER A COBERTURA SOLAR MAJORITÀRIA (CRITERI 3 MÉS FREDS) ..... 20
ANNEX 12 – DIMENSIONAT PER A COBERTURA SOLAR VARIABLE (VARIABLE 0,75) ..... 21
ANNEX 13 – DIMENSIONAT PER A COBERTURA SOLAR VARIABLE (VARIABLE 0,5) ..... 22
ANNEX 14 – DIMENSIONAT PER A COBERTURA SOLAR VARIABLE (VARIABLE 0,25) ..... 23
ANNEX 15 – DIMENSIONAT PER A COBERTURA SOLAR VARIABLE (VARIABLE 0,1) ..... 24
ANNEX 16 – CÀLCUL D'INTEGRACIÓ FOTOVOLTAICA ..... 25
ANNEX 17 – CARACTERÍSTIQUES DEL PANELL SOLAR FOTOVOLTAIC ..... 26
ANNEX 18 – DADES TÈCNIQUES DE PANELLS SOLARS D'AIRE ..... 27

# Annex 1 – Resultats parcials del càlcul de la càrrega tèrmica

1.1. Guanys de calor sensible de radiació

Resultats per al cas d'estudi a l'hivern:

| | $S_R$ | I | $h_f$ | $a_f$ | $A_f$ | f | Orien. |
|---|---|---|---|---|---|---|---|
| **Dorm. principal** | 234,52 | 192,59 | 1,5 | 1,98 | 2,97 | 0,41 | E |
| **Bany** | 21,44 | 41,43 | 0,75 | 0,69 | 0,5175 | 1 | N |
| **Dormitori nens** | 234,52 | 192,59 | 1,5 | 1,98 | 2,97 | 0,41 | O |
| **Hall i passadissos** | | | | | | | |
| **Bany petit** | | | | | | | |
| **Cuina** | 266,83 | 460,37 | 1,5 | 0,69 | 1,035 | 0,56 | S |
| **Office** | 320,32 | 192,59 | 1,5 | 1,98 | 2,97 | 0,56 | E |
| **Sala** | 683,65 | 460,37 | 1,5 | 3,96 | 5,94 | 0,25 | S |

$h_f$ = Alçada de la finestra.
$a_f$ = Amplada de la finestra.

**Total: 1761,28 W.**

Resultats per al cas d'estudi a l'estiu:

| | $S_R$ | I | $h_f$ | $a_f$ | $A_f$ | f | Orien. |
|---|---|---|---|---|---|---|---|
| **Dorm. principal** | 537,82 | 441,67 | 1,5 | 1,98 | 2,97 | 0,41 | E |
| **Bany** | 62,64 | 121,04 | 0,75 | 0,69 | 0,5175 | 1 | N |
| **Dormitori nens** | 537,82 | 441,67 | 1,5 | 1,98 | 2,97 | 0,41 | O |
| **Hall i passadissos** | | | | | | | |
| **Bany petit** | | | | | | | |
| **Cuina** | 233,85 | 403,47 | 1,5 | 0,69 | 1,035 | 0,56 | S |
| **Office** | 734,58 | 441,67 | 1,5 | 1,98 | 2,97 | 0,56 | E |
| **Sala** | 599,16 | 403,47 | 1,5 | 3,96 | 5,94 | 0,25 | S |

$h_f$ = Alçada de la finestra.
$a_f$ = Amplada de la finestra.

**Total: 2705,86 W.**

1.2. Pèrdues de calor sensible per transmissió

Resultats per al cas d'estudi a l'hivern. Casos diferenciats per finestres i murs en contacte amb l'exterior.

| Finestres | $ST_f$ | $k_f$ | $h_f$ | $a_f$ | $A_f$ | Ti | Te | $C_i$ | Or. | $C_o$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Dormitori principal** | 171,52 | 3,3 | 1,5 | 1,98 | 2,97 | 16 | 2 | 15% | E | 10% |
| **Bany** | 46,11 | 3,3 | 0,75 | 0,69 | 0,52 | 22 | 2 | 15% | N | 20% |
| **Dormitori nens** | 196,02 | 3,3 | 1,5 | 1,98 | 2,97 | 18 | 2 | 15% | O | 10% |
| **Hall i passadissos** | | | | | | | | | | |
| **Bany petit** | | | | | | | | | | |
| **Cuina** | 60,88 | 3,3 | 1,5 | 0,69 | 1,04 | 17,5 | 2 | 15% | S | 0% |
| **Office** | 220,52 | 3,3 | 1,5 | 1,98 | 2,97 | 20 | 2 | 15% | E | 10% |
| **Sala** | 428,30 | 3,3 | 1,5 | 3,96 | 5,94 | 21 | 2 | 15% | S | 0% |

| Murs | $ST_m$ | $k_m$ | $h_m$ | $a_m$ | $A_m$ | Ti | Te | Ci | Or. | $C_o$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Dormitori principal** | 678,04 | 1,5 | 3 | 8,61 | 25,83 | 16 | 2 | 15% | E | 10% |
| **Bany** | 354,78 | 1,5 | 3 | 2,92 | 8,76 | 22 | 2 | 15% | N | 20% |
| **Dormitori nens** | 766,80 | 1,5 | 3 | 8,52 | 25,56 | 18 | 2 | 15% | O | 10% |
| **Hall i passadissos** | | | | | | | | | | |
| **Bany petit** | | | | | | | | | | |
| **Cuina** | 552,66 | 1,5 | 3 | 6,89 | 20,67 | 17,5 | 2 | 15% | S | 0% |
| **Office** | 697,61 | 1,5 | 3 | 6,89 | 20,67 | 20 | 2 | 15% | E | 10% |
| **Sala** | 1015,70 | 1,5 | 3 | 10,3 | 30,99 | 21 | 2 | 15% | S | 0% |

**Total: 5188,95 W.**

Resultats per al cas d'estudi a l'estiu. Casos diferenciats per finestres i murs en contacte amb l'exterior.

| Finestres | $ST_f$ | $k_f$ | $h_f$ | $a_f$ | $A_f$ | Ti | Te | $C_i$ | Or. | $C_o$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Dormitori principal** | 67,63 | 3,3 | 1,5 | 1,98 | 2,97 | 25 | 31 | 15% | E | 0% |
| **Bany** | 10,76 | 3,3 | 0,75 | 0,69 | 0,52 | 25 | 31 | 15% | N | -10% |
| **Dormitori nens** | 67,63 | 3,3 | 1,5 | 1,98 | 2,97 | 25 | 31 | 15% | O | 0% |
| **Hall i passadissos** | | | | | | | | | | |
| **Bany petit** | | | | | | | | | | |
| **Cuina** | 23,57 | 3,3 | 1,5 | 0,69 | 1,04 | 25 | 31 | 15% | S | 0% |
| **Office** | 67,63 | 3,3 | 1,5 | 1,98 | 2,97 | 25 | 31 | 15% | E | 0% |
| **Sala** | 135,25 | 3,3 | 1,5 | 3,96 | 5,94 | 25 | 31 | 15% | S | 0% |

| Murs | $ST_m$ | $k_m$ | $h_m$ | $a_m$ | $A_m$ | Ti | Te | Ci | Or. | $C_o$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Dormitori principal** | 267,34 | 1,5 | 3 | 8,61 | 25,83 | 25 | 31 | 15% | E | 0% |
| **Bany** | 82,78 | 1,5 | 3 | 2,92 | 8,76 | 25 | 31 | 15% | N | -10% |
| **Dormitori nens** | 264,55 | 1,5 | 3 | 8,52 | 25,56 | 25 | 31 | 15% | O | 0% |
| **Hall i passadissos** | | | | | | | | | | |
| **Bany petit** | | | | | | | | | | |
| **Cuina** | 213,93 | 1,5 | 3 | 6,89 | 20,67 | 25 | 31 | 15% | S | 0% |
| **Office** | 213,93 | 1,5 | 3 | 6,89 | 20,67 | 25 | 31 | 15% | E | 0% |
| **Sala** | 320,75 | 1,5 | 3 | 10,33 | 30,99 | 25 | 31 | 15% | S | 0% |

**Total: 1735,74 W.**

1.3. Pèrdues de calor sensible i latent per ventilació.

Resultats per al cas d'estudi a l'hivern.

| | SV | LV | $\dot{v}$ | Ti | Te | He | Hi |
|---|---|---|---|---|---|---|---|
| **Dormitori principal** | 171,36 | 134,46 | 36 | 16 | 2 | 2,5 | 7 |
| **Bany** | 367,20 | 201,69 | 54 | 22 | 2 | 2,5 | 7 |
| **Dormitori nens** | 195,84 | 134,46 | 36 | 18 | 2 | 2,5 | 7 |
| **Hall i passadissos** | 177,36 | 108,24 | 28,98 | 20 | 2 | 2,5 | 7 |
| **Bany petit** | 330,48 | 201,69 | 54 | 20 | 2 | 2,5 | 7 |
| **Cuina** | 493,27 | 349,60 | 93,6 | 17,5 | 2 | 2,5 | 7 |
| **Office** | 165,24 | 100,85 | 27 | 20 | 2 | 2,5 | 7 |
| **Sala** | 279,07 | 161,35 | 43,2 | 21 | 2 | 2,5 | 7 |

**Total:**

**SV = 2179,82 W**
**LV = 1392,33 W**

Resultats per al cas d'estudi a l'estiu.

| | SV | LV | $\dot{v}$ | Ti | Te | He | Hi |
|---|---|---|---|---|---|---|---|
| **Dormitori principal** | 73,44 | 209,16 | 36 | 25 | 31 | 17 | 10 |
| **Bany** | 110,16 | 313,74 | 54 | 25 | 31 | 17 | 10 |
| **Dormitori nens** | 73,44 | 209,16 | 36 | 25 | 31 | 17 | 10 |
| **Hall i passadissos** | 59,12 | 168,37 | 28,98 | 25 | 31 | 17 | 10 |
| **Bany petit** | 110,16 | 313,74 | 54 | 25 | 31 | 17 | 10 |
| **Cuina** | 190,94 | 543,82 | 93,6 | 25 | 31 | 17 | 10 |
| **Office** | 55,08 | 156,87 | 27 | 25 | 31 | 17 | 10 |
| **Sala** | 88,13 | 250,99 | 43,2 | 25 | 31 | 17 | 10 |

**Total:**

**SV = 760,47 W**
**LV = 2165,85 W**

1.4. Guanys de calor sensible i latent per ocupació

Resultats per al cas d'estudi tant a l'estiu com a l'hivern:

| | SO | LO | np | $f_o$ | $f_h$ |
|---|---|---|---|---|---|
| **Dormitori principal** | 38,67 | 29,33 | 2 | 1 | 0,33 |
| **Bany** | 1,21 | 0,92 | 4 | 0,25 | 0,02 |
| **Dormitori nens** | 48,33 | 36,67 | 2 | 1 | 0,42 |
| **Hall i passadissos** | 0,24 | 0,18 | 4 | 0,5 | 0,00 |
| **Bany petit** | 0,60 | 0,46 | 4 | 0,25 | 0,01 |
| **Cuina** | 7,25 | 5,50 | 2 | 0,75 | 0,08 |
| **Office** | 7,25 | 5,50 | 2 | 0,75 | 0,08 |
| **Sala** | 21,75 | 16,50 | 4 | 0,75 | 0,13 |

**Total:**

**SO = 125,30 W.**

**LO = 95,06 W.**

## Annex 2 – Irradiància mensual segons l'orientació

| **90º S** | **Rad ($MJ/m^2dia$)** | **Dies** | **Rad ($MJ/m^2mes$)** | **Rad ($Wh/m^2dia$)** | **Hores Sol/dia** | **I ($W/m^2$)** |
|---|---|---|---|---|---|---|
| Gener | 12,43 | 31 | 385,33 | 3453 | 7,5 | 460,37 |
| Agost | 11,62 | 31 | 360,22 | 3228 | 8 | 403,47 |
| | | | | | | |
| **90º E/O** | **Rad ($MJ/m^2dia$)** | **Dies** | **Rad ($MJ/m^2mes$)** | **Rad ($Wh/m^2dia$)** | **Hores Sol/dia** | **I ($W/m^2$)** |
| Gener | 5,2 | 31 | 161,2 | 1444 | 7,5 | 192,59 |
| Agost | 12,72 | 31 | 394,32 | 3533 | 8 | 441,67 |
| | | | | | | |
| **90º N** | **Rad ($MJ/m^2dia$)** | **Dies** | **Rad ($MJ/m^2mes$)** | **Rad ($Wh/m^2dia$)** | **Hores Sol/dia** | **I ($W/m^2$)** |
| Gener | 1,1187 | 31 | 34,6797 | 311 | 7,5 | 41,43 |
| Agost | 3,486 | 31 | 108,066 | 968 | 8 | 121,04 |

## Annex 3 – Consum d'aigua calenta segons el tipus d'edifici

| Taula de demanda de referència d'aigua calenta sanitària a 60ºC | |
|---|---|
| Criteris de demanda | Litres ACS/dia a 60ºC |
| Habitatges | 28 litres/persona |
| Hospitals, clíniques | 55 litres/persona |
| Ambulatoris i centres de salut | 40 litres/persona |
| Hotels de 5 estrelles | 70 litres/persona |
| Hotels de 4 estrelles | 55 litres/persona |
| Hotels de 3 estrelles | 40 litres/persona |
| Hotels d'1 i 2 estrelles | 35 litres/persona |
| Pensions/Hostals | 28 litres/persona |
| Residències (gent gran, estudiants) | 40 litres/persona |
| Albergs | 25 litres/persona |
| Centres escolars amb dutxes | 20 litres/persona |
| Centres escolars sense dutxes | 4 litres/persona |
| Centres de l'Administració pública, bancs i oficines | 2 litres/persona |
| Vestuaris/dutxes col·lectives (piscines, poliesportius, gimnasos) | 20 litres/persona |

# Annex 4 – Dades tècniques captador Unisol Plus

BRANCH OFFICES:
SEVILLA
BILBAO
BARCELONA
VALENCIA
SALAMANCA
VIGO
OVIEDO
ZARAGOZA
BADAJOZ

Soliker
WITH RENEWABLE ENERGY

## UNISOL PLUS

| COLLECTOR EFFICIENCY EN-12975*, NPS-31609 | |
|---|---|
| EFFICIENCY ρ | 0,774 |
| HEAT LOST COEFFICIENT - k1 | 3,500 |
| HEAT LOST COEFFICIENT - k2 | 0,024 |

*Aperture Area, 2,06 m²

| ABSORBER | |
|---|---|
| ABSORBER TYPE | Tube grid / Aluminium |
| ABSORBER SURFACE | 2,07 m² |
| SOLAR ABSORTANCE | 95% ± 2% |
| EMITTANCE | 5% ± 2% |
| FLUID CONTENT | 1,34 litros |
| MAXIMUM OPERATING PRESSUREO | 8 Kg/cm² |

| COVER | |
|---|---|
| TYPE | Tempered glass |
| THICKNESS | 3,2 mm ± 0,2 mm |
| Fe | < 0,03% |
| COVER SOLAR TRANSMITTANCE | 91% |

| INSULATION | LATERAL | BACK |
|---|---|---|
| TYPE | Melamine | Mineral wool |
| THICKNESS | 6 mm | 30 mm |

| MORE SPECIFICATIONS | |
|---|---|
| MAXIMUM STAGNATION TEMPERATURE | 30ºC temp. and 1.000W/m² (study conditions) 187,4 ºC |
| BACK | Polyester reinforced with fiberglass |
| MAXIMUM NUMBER OF COLLECTOR IN BATTERY | 6 |
| COLLECTOR DISTANCE | 75-80 mm |
| FLOW RANGE | 50-150 l/h |
| NUMBER COLLECTOR/PALET | 12 |
| INDIVIDUAL PACKING | Cardboard |
| GUARANTEE | 10 Years |

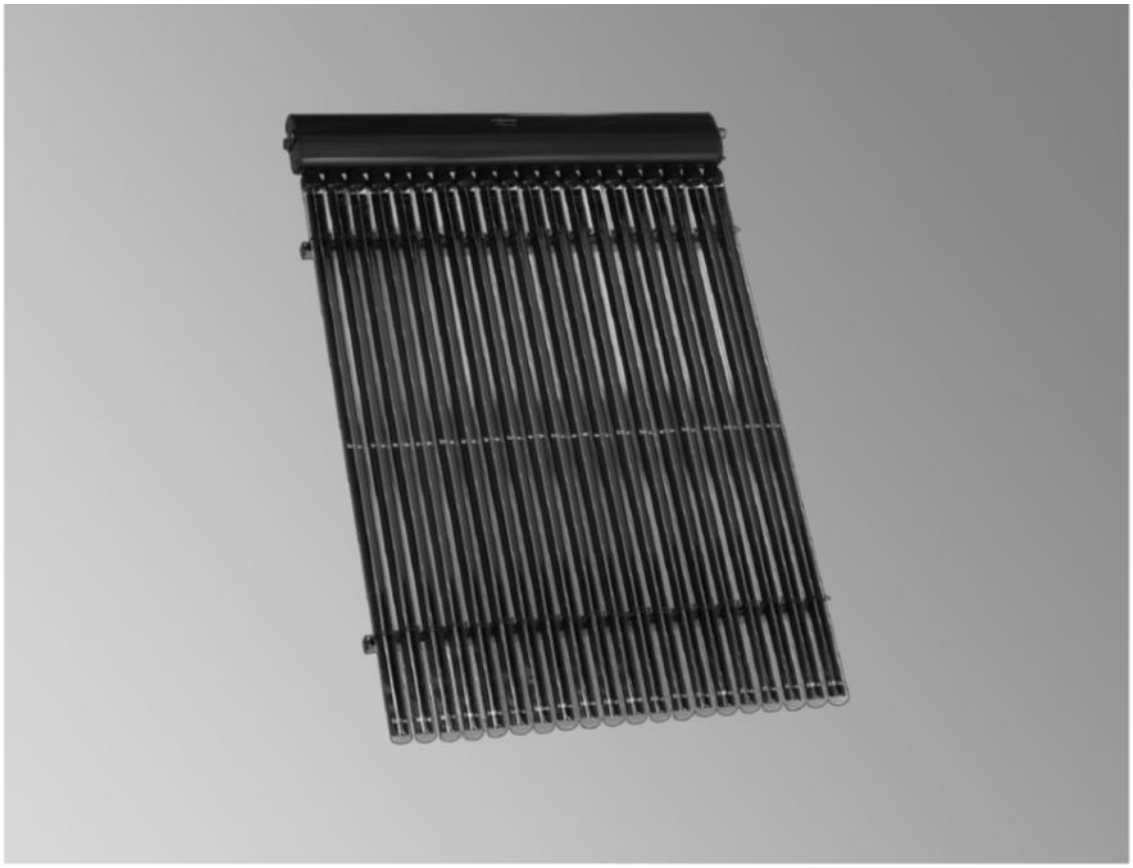
| DIMENSIONS AND WEIGHTS (BOX) | PLUS | PLUS H |
|---|---|---|
| TOTAL AREA | 2,29 m² | 2,29 m² |
| LENGTH | 2.040 mm | 1.120 mm |
| WIDTH | 1.120 mm | 2.040 mm |
| HEIGHT | 105 mm | 105 mm |
| WEIGHT | 44,2 Kg | 44,2 Kg |

All specifications are subject to change without notice.

FACTORY
El Navazo - Ctra. de Candelario, Km. 1,8
37700 Béjar · SALAMANCA (Spain)
Tel.: +34 923 400 400 · Fax: +34 923 400 154
info@grupounisolar.com · www.grupounisolar.com · www.soliker.com

BUSINESS ADDRESS
Playa de las Américas, 2 Edif. Codesa 2
Ctra. La Coruña (Salida Las Matas) · 28230 Las Rozas · MADRID (Spain)
Tel.: +34 916 305 893 · Fax: +34 916 301 071
comercial@grupounisolar.com

# Annex 5 – Dades tècniques captador Viessmann Vitosol 200-T



**VITOSOL 200-T** Modelo SP2

## Datos técnicos

| **Modelo SP2** | | **2 m²** | **3 m²** |
|---|---|---|---|
| **Número de tubos** | | 20 | 30 |
| **Superficie bruta** | m² | 2.866 | 4.343 |
| **Superficie de absorción** | m² | 2.013 | 3.019 |
| **Superficie de apertura** | m² | 2.147 | 3.222 |
| **Posición de montaje** (consultar la siguiente Fig.) | | Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ, Ⓕ, Ⓖ | |
| **Distancia entre colectores** | mm | 102 | 102 |
| **Dimensiones** | | | |
| Anchura a | mm | 1420 | 2129 |
| Altura b | mm | 2040 | 2040 |
| Profundidad c | mm | 143 | 143 |
| – **Rendimiento óptico** (área apertura) | % | 71,9 | 73,1 |
| – **Coeficiente de pérdida de calor $k_1$** | W/(m² · K) | 1,45 | 1,30 |
| – **Coeficiente de pérdida de calor $k_2$** | W/(m² · K²) | 0,0051 | 0,0077 |
| – **Rendimiento óptico** (área absorción) | % | 76,7 | 77,7 |
| – **Coeficiente de pérdida de calor $k_1$** | W/(m² · K) | 1,54 | 1,39 |
| – **Coeficiente de pérdida de calor $k_2$** | W/(m² · K²) | 0,0055 | 0,0082 |
| **Capacidad térmica** | kJ/(m² · K) | 7,8 | 6,8 |
| **Peso** | kg | 58 | 87 |
| **Volumen de fluido (medio portador de calor)** | litros | 1,13 | 1,65 |
| **Presión de servicio adm.:** | bar | 6 | 6 |
| **Temperatura máx. de inactividad** | °C | 270 | 270 |
| **Capacidad de producción de vapor** | W/m² | 100 | 100 |
| **Conexión** | Ø en mm | 22 | 22 |

# Annex 6 – Pressupost d'instal·lació de terra radiant

uponor

**CALEFACCIÓN POR SUELO RADIANTE UPONOR WIRSBO-EVALPEX**

| | | | | | |
|---|---|---|---|---|---|
| Nº REGISTRO | 190307 | SUPERFICIE ($m^2$) A CALEFACTAR: | 101 | OBRA: TFM | |
| CLIENTE: | Marc Gasulla | DISTANCIA ENTRE TUBOS (cm): | 16 | LOCALIZACIÓN: | Barcelona |

| CÓDIGO | EMBALAJE | ARTÍCULO | CANTIDAD | P.V.P. (EUROS) |
|---|---|---|---|---|
| 110301610 | Rollo de 200 m | Uponor Wirsbo-evalPex 16x1,8 | 800 m | 1.216,00 |
| 30201011 | Caja 15 paneles | Uponor Panel portatubos 11 mm | 90 uds. | 1.226,70 |
| 350000007 | Rollo de 200 m2 | Uponor Film de Polietileno | 200 m2 | 134,00 |
| 350000002 | Rollo de 25 m | Uponor Zócalo perimetral | 150 m | 190,50 |
| 350000010 | Garrafa de 30 Kg | Uponor Aditivo para mortero | 30 Kg. | 187,80 |

| CÓDIGO | DIMENSIÓN | ARTÍCULO | CANTIDAD | P.V.P. (EUROS) |
|---|---|---|---|---|
| 801201 | Kit 2 s. - 1 x 3/4 | Uponor Kit colector básico - 2 salidas | 2 uds. | 289,46 |
| 801221 | 1 s. - 1 x 3/4 | Uponor Módulo básico - 1 salida | 7 uds. | 224,70 |
| 302027 | 16x1,8 | U. Adaptador T. U. Wirsbo eval-pex 16x1 | 22 uds. | 0 (incluidos) |
| 20189026 | 16/17 | Uponor Curvatubo 16/17 | 22 uds. | 32,34 |
| 880000507 | 700 x 550 mm | Uponor Caja metálica para colectores-5 a | 2 uds. | 225,68 |

| CÓDIGO | ARTÍCULO | CANTIDAD | P.V.P. (EUROS) |
|---|---|---|---|
| 78594 | Uponor Cabezal electrotérmico para Kit colector 220 V | 11 uds. | 363,00 |
| 302016 | Uponor Unidad Base Genius 220 V | 1 uds. | 478,07 |
| 302017 | Uponor Termostato transmisor Genius | 3 uds. | 336,72 |
| 125012 | Uponor Grupo de impulsón - Grupo 22N | 1 ud. | 653,79 |

**TOTAL P.V.P.: 5558,76 EUROS**

# Annex 7 – Taules de capacitat de la bomba de calor aire-aire

DAIKIN • Outdoor Unit • Multi model application • MXS-F

## 5 Capacity tables

### 5 - 3 Heating Capacity Tables

**4MXS68F**

**Heating (50Hz 230V)**

| Combination (Capacity) | Indoor air temp. °CDB | Outdoor air temp.: °CWB -15°C TC kW | -15°C PI kW | -10°C TC kW | -10°C PI kW | -5°C TC kW | -5°C PI kW | 0°C TC kW | 0°C PI kW | 6°C TC kW | 6°C PI kW | 10°C TC kW | 10°C PI kW | 15°C TC kW | 15°C PI kW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.0+2.0+2.0+4.2 | 16.0 | 5.86 | 2.13 | 7.06 | 2.24 | 8.25 | 2.34 | 9.45 | 2.45 | 10.88 | 2.58 | 11.84 | 2.67 | 13.03 | 2.78 |
| | 18.0 | 5.71 | 2.15 | 6.91 | 2.26 | 8.11 | 2.37 | 9.30 | 2.48 | 10.74 | 2.61 | 11.69 | 2.69 | 12.89 | 2.80 |
| | 20.0 | 5.57 | 2.18 | 6.76 | 2.28 | 7.96 | 2.39 | 9.16 | 2.50 | **10.59** | **2.63** | 11.55 | 2.72 | 12.74 | 2.82 |
| | 21.0 | 5.49 | 2.19 | 6.69 | 2.30 | 7.89 | 2.40 | 9.08 | 2.51 | 10.52 | 2.64 | 11.47 | 2.73 | 12.67 | 2.84 |
| | 22.0 | 5.42 | 2.20 | 6.62 | 2.31 | 7.81 | 2.42 | 9.01 | 2.52 | 10.44 | 2.65 | 11.40 | 2.74 | 12.60 | 2.85 |
| | 24.0 | 5.28 | 2.22 | 6.47 | 2.33 | 7.67 | 2.44 | 8.86 | 2.55 | 10.30 | 2.68 | 11.25 | 2.76 | 12.45 | 2.87 |
| 2.0+2.0+2.0+5.0 | 16.0 | 5.89 | 2.05 | 7.10 | 2.16 | 8.30 | 2.26 | 9.50 | 2.37 | 10.94 | 2.49 | 11.91 | 2.58 | 13.11 | 2.68 |
| | 18.0 | 5.75 | 2.08 | 6.95 | 2.18 | 8.15 | 2.29 | 9.35 | 2.39 | 10.80 | 2.52 | 11.76 | 2.60 | 12.96 | 2.71 |
| | 20.0 | 5.60 | 2.10 | 6.80 | 2.21 | 8.00 | 2.31 | 9.21 | 2.41 | **10.65** | **2.54** | 11.61 | 2.62 | 12.81 | 2.73 |
| | 21.0 | 5.53 | 2.11 | 6.73 | 2.22 | 7.93 | 2.32 | 9.13 | 2.43 | 10.58 | 2.55 | 11.54 | 2.64 | 12.74 | 2.74 |
| | 22.0 | 5.45 | 2.12 | 6.65 | 2.23 | 7.86 | 2.33 | 9.06 | 2.44 | 10.50 | 2.56 | 11.47 | 2.65 | 12.67 | 2.75 |
| | 24.0 | 5.31 | 2.15 | 6.51 | 2.25 | 7.71 | 2.36 | 8.91 | 2.46 | 10.36 | 2.59 | 11.32 | 2.67 | 12.52 | 2.77 |
| 2.0+2.0+2.5+2.5 | 16.0 | 5.80 | 2.08 | 6.99 | 2.19 | 8.17 | 2.29 | 9.36 | 2.40 | 10.78 | 2.52 | 11.73 | 2.61 | 12.91 | 2.71 |
| | 18.0 | 5.66 | 2.10 | 6.84 | 2.21 | 8.03 | 2.31 | 9.21 | 2.42 | 10.63 | 2.55 | 11.58 | 2.63 | 12.77 | 2.74 |
| | 20.0 | 5.52 | 2.13 | 6.70 | 2.23 | 7.88 | 2.34 | 9.07 | 2.44 | **10.49** | **2.57** | 11.44 | 2.65 | 12.62 | 2.76 |
| | 21.0 | 5.44 | 2.14 | 6.63 | 2.24 | 7.81 | 2.35 | 9.00 | 2.45 | 10.42 | 2.58 | 11.37 | 2.67 | 12.55 | 2.77 |
| | 22.0 | 5.37 | 2.15 | 6.55 | 2.25 | 7.74 | 2.36 | 8.92 | 2.47 | 10.35 | 2.59 | 11.29 | 2.68 | 12.48 | 2.78 |
| | 24.0 | 5.23 | 2.17 | 6.41 | 2.28 | 7.59 | 2.38 | 8.78 | 2.49 | 10.20 | 2.62 | 11.15 | 2.70 | 12.33 | 2.81 |
| 2.0+2.0+2.5+3.5 | 16.0 | 5.86 | 2.13 | 7.06 | 2.24 | 8.25 | 2.34 | 9.45 | 2.45 | 10.88 | 2.58 | 11.84 | 2.67 | 13.03 | 2.78 |
| | 18.0 | 5.71 | 2.15 | 6.91 | 2.26 | 8.11 | 2.37 | 9.30 | 2.48 | 10.74 | 2.61 | 11.69 | 2.69 | 12.89 | 2.80 |
| | 20.0 | 5.57 | 2.18 | 6.76 | 2.28 | 7.96 | 2.39 | 9.16 | 2.50 | **10.59** | **2.63** | 11.55 | 2.72 | 12.74 | 2.82 |
| | 21.0 | 5.49 | 2.19 | 6.69 | 2.30 | 7.89 | 2.40 | 9.08 | 2.51 | 10.52 | 2.64 | 11.47 | 2.73 | 12.67 | 2.84 |
| | 22.0 | 5.42 | 2.20 | 6.62 | 2.31 | 7.81 | 2.42 | 9.01 | 2.52 | 10.44 | 2.65 | 11.40 | 2.74 | 12.60 | 2.85 |
| | 24.0 | 5.28 | 2.22 | 6.47 | 2.33 | 7.67 | 2.44 | 8.86 | 2.55 | 10.30 | 2.68 | 11.25 | 2.76 | 12.45 | 2.87 |
| 2.0+2.0+2.5+4.2 | 16.0 | 5.86 | 2.13 | 7.06 | 2.24 | 8.25 | 2.34 | 9.45 | 2.45 | 10.88 | 2.58 | 11.84 | 2.67 | 13.03 | 2.78 |
| | 18.0 | 5.71 | 2.15 | 6.91 | 2.26 | 8.11 | 2.37 | 9.30 | 2.48 | 10.74 | 2.61 | 11.69 | 2.69 | 12.89 | 2.80 |
| | 20.0 | 5.57 | 2.18 | 6.76 | 2.28 | 7.96 | 2.39 | 9.16 | 2.50 | **10.59** | **2.63** | 11.55 | 2.72 | 12.74 | 2.82 |
| | 21.0 | 5.49 | 2.19 | 6.69 | 2.30 | 7.89 | 2.40 | 9.08 | 2.51 | 10.52 | 2.64 | 11.47 | 2.73 | 12.67 | 2.84 |
| | 22.0 | 5.42 | 2.20 | 6.62 | 2.31 | 7.81 | 2.42 | 9.01 | 2.52 | 10.44 | 2.65 | 11.40 | 2.74 | 12.60 | 2.85 |
| | 24.0 | 5.28 | 2.22 | 6.47 | 2.33 | 7.67 | 2.44 | 8.86 | 2.55 | 10.30 | 2.68 | 11.25 | 2.76 | 12.45 | 2.87 |
| 2.0+2.0+3.5+3.5 | 16.0 | 5.92 | 2.15 | 7.12 | 2.26 | 8.33 | 2.37 | 9.54 | 2.48 | 10.99 | 2.61 | 11.95 | 2.70 | 13.16 | 2.81 |
| | 18.0 | 5.77 | 2.18 | 6.97 | 2.29 | 8.18 | 2.40 | 9.39 | 2.50 | 10.84 | 2.64 | 11.80 | 2.72 | 13.01 | 2.83 |
| | 20.0 | 5.62 | 2.20 | 6.83 | 2.31 | 8.03 | 2.42 | 9.24 | 2.53 | **10.69** | **2.66** | 11.66 | 2.75 | 12.86 | 2.86 |
| | 21.0 | 5.55 | 2.21 | 6.75 | 2.32 | 7.96 | 2.43 | 9.17 | 2.54 | 10.62 | 2.67 | 11.58 | 2.76 | 12.79 | 2.87 |
| | 22.0 | 5.47 | 2.22 | 6.68 | 2.33 | 7.89 | 2.44 | 9.09 | 2.55 | 10.54 | 2.68 | 11.51 | 2.77 | 12.72 | 2.88 |
| | 24.0 | 5.33 | 2.25 | 6.53 | 2.36 | 7.74 | 2.47 | 8.95 | 2.58 | 10.39 | 2.71 | 11.36 | 2.80 | 12.57 | 2.91 |
| 2.0+2.5+2.5+2.5 | 16.0 | 5.80 | 2.08 | 6.99 | 2.19 | 8.17 | 2.29 | 9.36 | 2.40 | 10.78 | 2.52 | 11.73 | 2.61 | 12.91 | 2.71 |
| | 18.0 | 5.66 | 2.10 | 6.84 | 2.21 | 8.03 | 2.31 | 9.21 | 2.42 | 10.63 | 2.55 | 11.58 | 2.63 | 12.77 | 2.74 |
| | 20.0 | 5.52 | 2.13 | 6.70 | 2.23 | 7.88 | 2.34 | 9.07 | 2.44 | **10.49** | **2.57** | 11.44 | 2.65 | 12.62 | 2.76 |
| | 21.0 | 5.44 | 2.14 | 6.63 | 2.24 | 7.81 | 2.35 | 9.00 | 2.45 | 10.42 | 2.58 | 11.37 | 2.67 | 12.55 | 2.77 |
| | 22.0 | 5.37 | 2.15 | 6.55 | 2.25 | 7.74 | 2.36 | 8.92 | 2.47 | 10.35 | 2.59 | 11.29 | 2.68 | 12.48 | 2.78 |
| | 24.0 | 5.23 | 2.17 | 6.41 | 2.28 | 7.59 | 2.38 | 8.78 | 2.49 | 10.20 | 2.62 | 11.15 | 2.70 | 12.33 | 2.81 |

3D075077

**SYMBOLS - ABKÜRZUNGEN**
**ΣΥΜΒΟΛΑ - SIMBOLOS**
**SIMBOLES - SIMBOLI**
**VERKLARING - ОБОЗНАЧЕНИЯ**
**SEMBOLLER**

TC: Total capacity (kW)
PI: Power input (kW)

TC: Gesamtleistung (kW)
PI: Leistungsaufnahme (kW)

TC: Συνολική απόδοση (kW)
PI: Ισχύς εισόδου (kW)

TC: Capacidad total (kW)
PI: Potencia consumida (kW)

TC: Puissance totale (kW)
PI: Puissance absorbée (kW)

TC: Capacità totale (kW)
PI: Potenza assorbita (kW)

TC: Totale capaciteit (kW)
PI: Opgenomen vermogen (kW)

TC: Общая мощность (кВт)
PI: Входная мощность (кВт)

TC: Toplam kapasite (kW)
PI: Güç girişi (kW)

**NOTES - ANMERKUNGEN - ΣΗΜΕΙΩΣΕΙΣ - NOTAS - REMARQUES - NOTE**
**OPMERKINGEN - ПРИМЕЧАНИЯ - NOTLAR**

1 Capacities are based on the following conditions.
- Corresponding refrigerant piping length: 5m
- Level difference: 0m

Die Kapazität basiert auf den folgenden Bedingungen:
- Entsprechende Kältemittelrohrlänge: 5m
- Höhenunterschied: 0m

Οι αποδόσεις βασίζονται στις ακόλουθες συνθήκες.
- Αντίστοιχο μήκος συλλογώσεων ψυκτικού: 5m
- Υψομετρική διαφορά :0m

Las capacidades se basan en las siguientes condiciones.
- Longitud de tubería de refrigerante equivalente : 5m
- Diferencia de nivel: 0m

Les puissances sont basées sur les conditions suivantes.
- Longueur de tuyauterie correspondante du réfrigérant : 5m
- Dénivellation: 0m

Le capacità si basano sulle seguenti condizioni.
- Lunghezza equivalente delle tubazioni del refrigerante: 5m
- Dislivello: 0m

De capaciteit is gebaseerd op de volgende situatie.
- Overeenstemmende leidinglengte koelvloeistof: 5m
- Niveauverschil: 0m

Данные мощности основаны на следующих условиях.
- Соответствующая длина трубы охлаждения: 5м
- Разность уровней - 0м

Kapasiteler aşağıdaki koşullara bağlıdır
- İlgili soğutucu boru uzunluğu: 5m
- Seviye farkı: 0m

2 The bold line ▭ is indicated the standard condition.
Die dicke Linie ▭ kennzeichnet die Standardbedingung.
Η έντονη γραμμή ▭ υποδηλώνει την κανονική κατάσταση.
La línea en negrita ▭ indica las condiciones estándar.
La ligne en gras ▭ indique un état standard.
La linea in grassetto ▭ indica la condizione standard.
De vette lijn ▭ duidt de standaardtoestand aan.
Жирная линия ▭ указывает стандартное условие.
Kalın çizgi ▭ standart koşul olarak belirtilmektedir.

3 The above is the value for connecting with the following indoor units. 1.5; 2.0; 2.5; 3.5kW class; wall mounted K series. 4.2; 5.0kW class; wall mounted J series. 6.0kW class; wall mounted G series.
Der obige Wert gilt für den Anschluss an die folgenden Innengeräte. Klasse 1,5; 2,0; 2,5; 3,5kW Wandgerät vom Typ K. Klasse 4,2; 5,0kW Wandgerät vom Typ J. Klasse 6,0kW Wandgerät vom Typ G.
Η παραπάνω είναι τιμή για σύνδεση με τις παρακάτω εσωτερικές μονάδες. Κατηγορία 1,5; 2,0; 2,5; 3,5kW επίτοιχη σειρά K. Κατηγορία 4,2; 5,0kW επίτοιχη σειρά J. Κατηγορία 6,0kW επίτοιχη σειρά G.
El valor anterior es válido para la conexión con las unidades interiores siguientes. Clase 1,5; 2,0; 2,5; 3,5kW unidad de pared de la serie K. Clase 4,2; 5,0kW unidad de pared de la serie J. Clase 6,0kW unidad de pared de la serie G.
La valeur ci-avant est la valeur pour la connexion aux unités intérieures suivantes. Série murale K, classe 1,5; 2,0; 2,5; 3,5kW. Série murale J, classe 4,2; 5,0kW. Série murale G, classe 6,0kW.
Il valore indicato in alto si riferisce al collegamento delle seguenti unità interne. Classe 1,5; 2,0; 2,5; 3,5kW serie a parete K. Classe 4,2; 5,0kW serie a parete J. Classe 6,0kW serie a parete G.
Bovenstaande waarde is de waarde voor verbinding met de volgende binnenunits. Klasse 1,5; 2,0; 2,5; 3,5kW reeks K voor wandmontage. Klasse 4,2; 5,0kW reeks J voor wandmontage. Klasse 6,0kW reeks G voor wandmontage.
Значение выше является значением для подсоединения со следующими внутренними блоками. Класс 1.5; 2.0; 2.5; 3.5кВт настенный блок серии K. Класс 4.2; 5.0кВт настенный блок серии J. Класс 6.0кВт настенный блок серии G.
Yukarıdaki değer aşağıdaki iç ünitelerle bağlantı içindir. 1.5; 2.0; 2.5; 3.5kW sınıfı; duvar tipi K serisi. 4.2; 5.0kW sınıfı; duvar tipi J serisi. 6.0kW sınıfı; duvar tipi G serisi.

# 5 Capacity tables

## 5 - 2 Cooling Capacity Tables

### 4MXS68F

**Cooling (50Hz 230V)**

| Combination (Capacity) | Outdoor air temp. °CDB | Indoor air temp.: °CWB 14°C TC kW | 14°C PI kW | 16°C TC kW | 16°C PI kW | 18°C TC kW | 18°C PI kW | 19°C TC kW | 19°C PI kW | 22°C TC kW | 22°C PI kW | 24°C TC kW | 24°C PI kW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.5+3.5+3.5 | 22.0 | 8.19 | 2.51 | 8.56 | 2.56 | 8.94 | 2.61 | 9.13 | 2.64 | 9.68 | 2.71 | 10.06 | 2.76 |
| | 25.0 | 7.96 | 2.61 | 8.34 | 2.65 | 8.71 | 2.70 | 8.90 | 2.73 | 9.46 | 2.80 | 9.84 | 2.85 |
| | 32.0 | 7.43 | 2.83 | 7.80 | 2.88 | 8.18 | 2.93 | 8.37 | 2.96 | 8.93 | 3.03 | 9.30 | 3.08 |
| | 35.0 | 7.20 | 2.94 | 7.58 | 2.99 | 7.95 | 3.04 | **8.14** | **3.06** | 8.70 | 3.14 | 9.08 | 3.19 |
| | 40.0 | 6.66 | 2.81 | 6.98 | 2.81 | 7.29 | 2.81 | 7.45 | 2.81 | 7.90 | 2.81 | 8.19 | 2.81 |
| | 43.0 | 5.98 | 2.31 | 6.24 | 2.31 | 6.50 | 2.31 | 6.62 | 2.31 | 6.98 | 2.31 | 7.28 | 2.31 |
| | 46.0 | 5.10 | 1.80 | 5.30 | 1.80 | 5.50 | 1.80 | 5.60 | 1.80 | 5.88 | 1.80 | 6.07 | 1.80 |
| 2.5+3.5+4.2 | 22.0 | 8.31 | 2.61 | 8.69 | 2.66 | 9.07 | 2.71 | 9.26 | 2.73 | 9.83 | 2.81 | 10.21 | 2.86 |
| | 25.0 | 8.08 | 2.70 | 8.46 | 2.75 | 8.84 | 2.80 | 9.03 | 2.83 | 9.60 | 2.90 | 9.98 | 2.95 |
| | 32.0 | 7.54 | 2.94 | 7.92 | 2.99 | 8.30 | 3.04 | 8.49 | 3.06 | 9.06 | 3.14 | 9.44 | 3.19 |
| | 35.0 | 7.31 | 3.05 | 7.69 | 3.10 | 8.07 | 3.15 | **8.26** | **3.17** | 8.83 | 3.25 | 9.21 | 3.30 |
| | 40.0 | 6.73 | 2.81 | 7.04 | 2.81 | 7.35 | 2.81 | 7.51 | 2.81 | 7.96 | 2.81 | 8.25 | 2.81 |
| | 43.0 | 6.05 | 2.31 | 6.31 | 2.31 | 6.56 | 2.31 | 6.69 | 2.31 | 7.05 | 2.31 | 7.29 | 2.31 |
| | 46.0 | 5.16 | 1.80 | 5.36 | 1.80 | 5.56 | 1.80 | 5.66 | 1.80 | 5.94 | 1.80 | 6.13 | 1.80 |
| 2.5+3.5+5.0 | 22.0 | 8.62 | 2.74 | 9.02 | 2.79 | 9.41 | 2.84 | 9.61 | 2.87 | 10.20 | 2.95 | 10.59 | 3.00 |
| | 25.0 | 8.38 | 2.83 | 8.78 | 2.89 | 9.17 | 2.94 | 9.37 | 2.97 | 9.96 | 3.05 | 10.36 | 3.10 |
| | 32.0 | 7.82 | 3.08 | 8.22 | 3.14 | 8.61 | 3.19 | 8.81 | 3.22 | 9.40 | 3.30 | 9.80 | 3.35 |
| | 35.0 | 7.58 | 3.20 | 7.98 | 3.25 | 8.37 | 3.31 | **8.57** | **3.33** | 9.16 | 3.41 | 9.56 | 3.47 |
| | 40.0 | 6.93 | 2.81 | 7.25 | 2.81 | 7.56 | 2.81 | 7.71 | 2.81 | 8.16 | 2.81 | 8.46 | 2.81 |
| | 43.0 | 6.23 | 2.31 | 6.49 | 2.31 | 6.74 | 2.31 | 6.87 | 2.31 | 7.24 | 2.31 | 7.47 | 2.31 |
| | 46.0 | 5.31 | 1.80 | 5.51 | 1.80 | 5.71 | 1.80 | 5.81 | 1.80 | 6.09 | 1.80 | 6.28 | 1.80 |
| 2.5+4.2+4.2 | 22.0 | 8.37 | 2.65 | 8.75 | 2.70 | 9.14 | 2.75 | 9.33 | 2.78 | 9.90 | 2.85 | 10.29 | 2.90 |
| | 25.0 | 8.14 | 2.74 | 8.52 | 2.79 | 8.90 | 2.84 | 9.09 | 2.87 | 9.67 | 2.95 | 10.05 | 3.00 |
| | 32.0 | 7.59 | 2.98 | 7.98 | 3.03 | 8.36 | 3.09 | 8.55 | 3.11 | 9.13 | 3.19 | 9.51 | 3.24 |
| | 35.0 | 7.36 | 3.09 | 7.75 | 3.15 | 8.13 | 3.20 | **8.32** | **3.22** | 8.89 | 3.30 | 9.28 | 3.35 |
| | 40.0 | 6.76 | 2.81 | 7.08 | 2.81 | 7.39 | 2.81 | 7.54 | 2.81 | 7.99 | 2.81 | 8.28 | 2.81 |
| | 43.0 | 6.08 | 2.31 | 6.34 | 2.31 | 6.60 | 2.31 | 6.72 | 2.31 | 7.09 | 2.31 | 7.32 | 2.31 |
| | 46.0 | 5.19 | 1.80 | 5.39 | 1.80 | 5.59 | 1.80 | 5.69 | 1.80 | 5.97 | 1.80 | 6.16 | 1.80 |
| 3.5+3.5+3.5 | 22.0 | 8.47 | 2.74 | 8.86 | 2.79 | 9.25 | 2.84 | 9.44 | 2.87 | 10.02 | 2.95 | 10.41 | 3.00 |
| | 25.0 | 8.23 | 2.83 | 8.62 | 2.89 | 9.01 | 2.94 | 9.20 | 2.97 | 9.79 | 3.05 | 10.17 | 3.10 |
| | 32.0 | 7.68 | 3.08 | 8.07 | 3.14 | 8.46 | 3.19 | 8.66 | 3.22 | 9.24 | 3.30 | 9.63 | 3.35 |
| | 35.0 | 7.45 | 3.20 | 7.84 | 3.25 | 8.23 | 3.31 | **8.42** | **3.33** | 9.00 | 3.41 | 9.39 | 3.47 |
| | 40.0 | 6.82 | 2.81 | 7.14 | 2.81 | 7.45 | 2.81 | 7.60 | 2.81 | 8.04 | 2.81 | 8.33 | 2.81 |
| | 43.0 | 6.15 | 2.31 | 6.40 | 2.31 | 6.66 | 2.31 | 6.78 | 2.31 | 7.14 | 2.31 | 7.38 | 2.31 |
| | 46.0 | 5.25 | 1.80 | 5.45 | 1.80 | 5.65 | 1.80 | 5.74 | 1.80 | 6.03 | 1.80 | 6.21 | 1.80 |
| 1.5+1.5+1.5+1.5 | 22.0 | 6.99 | 1.50 | 7.31 | 1.53 | 7.63 | 1.56 | 7.79 | 1.58 | 8.27 | 1.62 | 8.59 | 1.65 |
| | 25.0 | 6.80 | 1.56 | 7.12 | 1.59 | 7.44 | 1.62 | 7.60 | 1.63 | 8.08 | 1.68 | 8.40 | 1.70 |
| | 32.0 | 6.34 | 1.70 | 6.66 | 1.72 | 6.98 | 1.75 | 7.14 | 1.77 | 7.62 | 1.81 | 7.94 | 1.84 |
| | 35.0 | 6.15 | 1.76 | 6.47 | 1.79 | 6.79 | 1.82 | **6.95** | **1.83** | 7.43 | 1.88 | 7.75 | 1.91 |
| | 40.0 | 5.83 | 1.87 | 6.15 | 1.90 | 6.47 | 1.93 | 6.63 | 1.94 | 7.11 | 1.99 | 7.43 | 2.02 |
| | 43.0 | 5.63 | 1.94 | 5.95 | 1.97 | 6.27 | 2.00 | 6.43 | 2.02 | 6.91 | 2.06 | 7.23 | 2.09 |
| | 46.0 | 5.09 | 1.80 | 5.34 | 1.80 | 5.58 | 1.80 | 5.69 | 1.80 | 6.04 | 1.80 | 6.26 | 1.80 |

3D075085

**SYMBOLS - ABKÜRZUNGEN**
**ΣΥΜΒΟΛΑ - SIMBOLOS**
**SIMBOLES - SIMBOLI**
**VERKLARING - ОБОЗНАЧЕНИЯ**
**SEMBOLLER**

TC: Total capacity (kW)
PI: Power input (kW)

TC: Gesamtleistung (kW)
PI: Leistungsaufnahme (kW)

TC: Συνολική απόδοση (kW)
PI: Ισχύς εισόδου (kW)

TC: Capacidad total (kW)
PI: Potencia consumida (kW)

TC: Puissance totale (kW)
PI: Puissance absorbée (kW)

TC: Capacità totale (kW)
PI: Potenza assorbita (kW)

TC: Totale capaciteit (kW)
PI: Opgenomen vermogen (kW)

TC: Общая мощность (кВт)
PI: Входная мощность (кВт)

TC: Toplam kapasite (kW)
PI: Güç girişi (kW)

**NOTES - ANMERKUNGEN - ΣΗΜΕΙΩΣΕΙΣ - NOTAS - REMARQUES - NOTE**
**OPMERKINGEN - ПРИМЕЧАНИЯ - NOTLAR**

1 Capacities are based on the following conditions.
- Corresponding refrigerant piping length: 5m
- Level difference: 0m

Die Kapazität basiert auf den folgenden Bedingungen:
- Entsprechende Kältemittelrohrlänge: 5m
- Höhenunterschied: 0m

Οι αποδόσεις βασίζονται στις ακόλουθες συνθήκες.
- Αντίστοιχο μήκος σωληνώσεων ψυκτικού: 5m
- Υψομετρική διαφορά :0m

Las capacidades se basan en las siguientes condiciones.
- Longitud de tubería de refrigerante equivalente : 5m
- Diferencia de nivel: 0m

Les puissances sont basées sur les conditions suivantes.
- Longueur de tuyauterie correspondante du réfrigérant : 5m
- Dénivellation: 0m

Le capacità si basano sulle seguenti condizioni.
- Lunghezza equivalente delle tubazioni del refrigerante: 5m
- Dislivello: 0m

De capaciteit is gebaseerd op de volgende situatie.
- Overeenstemmende leidinglengte koelvloeistof: 5m
- Niveauverschil: 0m

Данные мощности основаны на следующих условиях.
- Соответствующая длина трубы охлаждения: 5м
- Разность уровней - 0м

Kapasiteler aşağıdaki koşullara bağlıdır
- İlgili soğutucu boru uzunluğu: 5m
- Seviye farkı: 0m

2 The bold line ▭ is indicated the standard condition.
Die dicke Linie ▭ kennzeichnet die Standardbedingung.
Η έντονη γραμμή ▭ υποδηλώνει την κανονική κατάσταση.
La linea en negrita ▭ indica las condiciones estándar.
La ligne en gras ▭ indique un état standard.
La linea in grassetto ▭ indica la condizione standard.
De vette lijn ▭ duidt de standaardtoestand aan.
Жирная линия ▭ указывает стандартное условие.
Kalın çizgi ▭ standart koşul olarak belirtilmektedir.

3 The above is the value for connecting with the following indoor units. 1.5; 2.0; 2.5; 3.5kW class; wall mounted K series. 4.2; 5.0kW class; wall mounted J series. 6.0kW class; wall mounted G series.
Der obige Wert gilt für den Anschluss an die folgenden Innengeräte. Klasse 1,5; 2,0; 2,5; 3,5kW Wandgerät vom Typ K. Klasse 4,2; 5,0kW Wandgerät vom Typ J. Klasse 6,0kW Wandgerät vom Typ G.
Η παραπάνω είναι τιμή για σύνδεση με τις παρακάτω εσωτερικές μονάδες. Κατηγορία 1,5; 2,0; 2,5; 3,5kW επίτοιχη σειρά K. Κατηγορία 4,2; 5,0kW επίτοιχη σειρά J. Κατηγορία 6,0kW επίτοιχη σειρά G.
El valor anterior es válido para la conexión con las unidades interiores siguientes. Clase 1,5; 2,0; 2,5; 3,5kW unidad de pared de la serie K. Clase 4,2; 5,0kW unidad de pared de la serie J. Clase 6,0kW unidad de pared de la serie G.
La valeur ci-avant est la valeur pour la connexion aux unités intérieures suivantes. Série murale K, classe 1,5; 2,0; 2,5; 3,5kW. Série murale J, classe 4,2; 5,0kW. Série murale G, classe 6,0kW.
Il valore indicato in alto si riferisce al collegamento delle seguenti unità interne. Classe 1,5; 2,0; 2,5; 3,5kW serie a parete K. Classe 4,2; 5,0kW serie a parete J. Classe 6,0kW serie a parete G.
Bovenstaande waarde is de waarde voor verbinding met de volgende binnenunits. Klasse 1,5; 2,0; 2,5; 3,5kW reeks K voor wandmontage. Klasse 4,2; 5,0kW reeks J voor wandmontage. Klasse 6,0kW reeks G voor wandmontage.
Значение выше является значением для подсоединения со следующими внутренними блоками. Класс 1.5; 2.0; 2.5; 3.5кВт настенный блок серии K. Класс 4.2; 5.0кВт настенный блок серии J. Класс 6.0кВт настенный блок серии G.
Yukarıdaki değer aşağıdaki iç ünitelerle bağlantı içindir. 1,5; 2,0; 2,5; 3,5kW sınıfı; duvar tipi K serisi. 4,2; 5,0kW sınıfı; duvar tipi J serisi. 6,0kW sınıfı; duvar tipi G serisi.

# Annex 8 – Taules de capacitat de la bomba de calor aire-aigua

DAIKIN • Daikin Altherma split de baja temperatura • EBHQ-BV3

## 4 Tablas de capacidad

### 4 - 1 Tablas de capacidades de calefacción

**EBHQ-BV3**

**Calefacción (Valores máximos)**

| Modelo | LWC | 30 | | 35 | | 40 | | 45 | | 50 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tamb | HC | PI | HC | PI | HC | PI | HC | PI | HC | PI |
| EBHQ006B*V3 EKCB(HX)006B*V3 | -15 | 3,93 | 1,54 | 3,67 | 1,65 | 3,47 | 1,77 | 3,33 | 1,90 | 3,25 | 2,05 |
| | -10 | 4,65 | 1,58 | 4,32 | 1,71 | 4,07 | 1,85 | 3,89 | 2,00 | 3,78 | 2,16 |
| | -7 | 5,14 | 1,60 | 4,77 | 1,74 | 4,49 | 1,89 | 4,28 | 2,05 | 4,15 | 2,22 |
| | -2 | 6,06 | 1,63 | 5,62 | 1,78 | 5,28 | 1,94 | 5,03 | 2,12 | 4,87 | 2,31 |
| | 2 | 6,89 | 1,63 | 6,38 | 1,80 | 6,00 | 1,97 | 5,72 | 2,17 | 5,53 | 2,37 |
| | 7 | 8,03 | 1,63 | 7,45 | 1,81 | 7,00 | 2,00 | 6,68 | 2,21 | 6,47 | 2,43 |
| EBHQ008B*V3 EKCB(HX)008B*V3 | -15 | 5,42 | 2,12 | 5,16 | 2,25 | 4,97 | 2,40 | 4,86 | 2,57 | 4,80 | 2,76 |
| | -10 | 6,27 | 2,19 | 5,93 | 2,35 | 5,68 | 2,52 | 5,51 | 2,71 | 5,42 | 2,92 |
| | -7 | 6,84 | 2,23 | 6,46 | 2,40 | 6,17 | 2,59 | 5,97 | 2,79 | 5,86 | 3,01 |
| | -2 | 7,92 | 2,28 | 7,45 | 2,47 | 7,10 | 2,68 | 6,85 | 2,91 | 6,70 | 3,16 |
| | 2 | 8,9 | 2,32 | 8,35 | 2,52 | 7,93 | 2,75 | 7,65 | 2,99 | 7,47 | 3,26 |
| | 7 | 10,2 | 2,34 | 9,58 | 2,57 | 9,10 | 2,82 | 8,76 | 3,08 | 8,56 | 3,37 |

**Notas**:
- Los valores de las tablas se pueden interpolar, pero NO se deben extrapolar.
- La unidad exterior cuenta con un calentador del vaso de expansión: cuando la temperatura ambiente es inferior a 4 °C: agregue un consumo de 50W

**Símbolos:**

| | |
|---|---|
| HC | Capacidad de calefacción a máxima frecuencia de funcionamiento, medida de acuerdo EN14511 [kW] |
| PI | Potencia consumida [kW] |
| LWC | Temperatura de salida del agua del condensador [°C] |
| Tamb | Temperatura ambiente [°C] RH=85% |

# 4 Tablas de capacidad

## 4 - 2 Tablas de capacidades de refrigeración

### EBHQ-BV3

**Refrigeración**

| Modelo | Tamb [°C] | 20 | | 25 | | 30 | | 35 | | 40 | | 43 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LWE [°C] | CC | PI | CC | PI | CC | PI | CC | PI | CC | PI | CC | PI |
| EBHQ006B*V3 + EKCBX006B*V3 | 7 | 6,01 | 1,62 | 5,73 | 1,81 | 5,43 | 2,01 | 5,12 | 2,22 | 4,80 | 2,45 | 4,59 | 2,59 |
| | 11 | 6,81 | 1,63 | 6,50 | 1,83 | 6,17 | 2,04 | 5,83 | 2,27 | 5,30 | 2,38 | 4,98 | 2,44 |
| | 13 | 7,23 | 1,63 | 6,90 | 1,84 | 6,56 | 2,06 | 6,20 | 2,29 | 5,56 | 2,34 | 5,18 | 2,36 |
| | 16 | 7,88 | 1,62 | 7,54 | 1,84 | 7,17 | 2,07 | 6,79 | 2,32 | 5,95 | 2,28 | 5,46 | 2,24 |
| | 20 | 8,80 | 1,61 | 8,42 | 1,85 | 8,03 | 2,09 | 7,63 | 2,35 | 6,48 | 2,19 | 5,82 | 2,05 |
| EBHQ008B*V3 + EKCBX008B*V3 | 7 | 8,24 | 2,49 | 7,90 | 2,74 | 7,52 | 3,00 | 7,10 | 3,29 | 5,68 | 2,92 | 4,87 | 2,65 |
| | 11 | 9,26 | 2,55 | 8,87 | 2,82 | 8,45 | 3,11 | 7,79 | 3,37 | 6,12 | 2,86 | 5,18 | 2,49 |
| | 13 | 9,79 | 2,58 | 9,38 | 2,86 | 8,93 | 3,16 | 8,14 | 3,42 | 6,34 | 2,83 | 5,33 | 2,41 |
| | 16 | 10,6 | 2,63 | 10,17 | 2,92 | 9,69 | 3,23 | 8,68 | 3,47 | 6,67 | 2,77 | 5,55 | 2,26 |
| | 20 | 11,7 | 2,69 | 11,3 | 3,00 | 10,75 | 3,32 | 9,39 | 3,54 | 7,09 | 2,67 | 5,80 | 2,05 |

**Notas:**
- Los valores de las tablas se pueden interpolar, pero NO se deben extrapolar.
- La unidad exterior cuenta con un calentador del vaso de expansión: cuando la temperatura ambiente es inferior a 4 °C: agregue un consumo de 50W

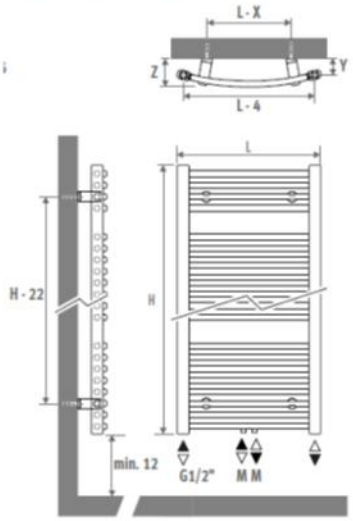
**Símbolos:**

| | |
|---|---|
| CC | Capacidad de refrigeración a máxima frecuencia de funcionamiento, medida de acuerdo EN14511 [kW] |
| PI | Potencia consumida [kW] |
| LWE | Temperatura de salida del agua del evaporador [°C] |
| Tamb | Temperatura ambiente [°C] RH=85% |

## Annex 9 – Característiques tècniques de radiadors de baixa temperatura

# SANI BASIC & SANI BOW

**BOW**




| L | X | Y | Z |
|---|---|---|---|
| 050 | 25.0 | 5.2 › 6.4 | 8.6 › 9.6 |
| 060 | 22.0 | 5.4 › 6.4 | 9.3 › 10.3 |
| 075 | 18.5 | 9.3 › 10.3 | 10.5 › 11.5 |

**BASIC**

| code | height | length | colour | conn. |
|---|---|---|---|---|
| SBAW . | 094 | 050 . | XXX | /MM |

*fill in colour code*

| | Watts 75/65 | Watts 55/45 | € st. colour | € other |
|---|---|---|---|---|
| **L** | **H 094** | | | |
| 050 | 427 | 224 | 368,20 | 441,80 |
| 060 | 505 | 265 | 387,60 | 465,10 |
| 075 | 620 | 326 | 402,80 | 483,40 |
| **L** | **H 132** | | | |
| 050 | 605 | 317 | 451,40 | 541,70 |
| 060 | 706 | 370 | 474,90 | 569,90 |
| 075 | 865 | 455 | 502,50 | 603,00 |
| **L** | **H 170** | | | |
| 050 | 775 | 405 | 534,20 | 641,00 |
| 060 | 906 | 476 | 561,50 | 673,80 |
| 075 | 1107 | 583 | 602,90 | 723,50 |
| **L** | **H 198** | | | |
| 050 | --- | --- | --- | --- |
| 060 | 1081 | 567 | 630,00 | 756,00 |
| 075 | 1317 | 694 | 682,00 | 818,40 |

**BOW**

| code | height | length | colour | conn. |
|---|---|---|---|---|
| SBOW . | 094 | 050 . | 233 | /MM |

| | Watts 75/65 | Watts 55/45 | € st. colour |
|---|---|---|---|
| **L** | **H 094** | | |
| 050 | 444 | 237 | 393,90 |
| 060 | 528 | 283 | 415,00 |
| 075 | 656 | 351 | 430,70 |
| **L** | **H 132** | | |
| 050 | 618 | 329 | 482,90 |
| 060 | 732 | 391 | 507,90 |
| 075 | 911 | 488 | 538,00 |
| **L** | **H 170** | | |
| 050 | 788 | 419 | 571,40 |
| 060 | 938 | 500 | 600,60 |
| 075 | 1159 | 622 | 645,20 |
| **L** | **H 198** | | |
| 050 | --- | --- | --- |
| 060 | 1122 | 597 | 674,00 |
| 075 | 1373 | 738 | 729,80 |

*EN442 output at 20°C room temperature*

### CONNECTION SETS

**Connection set to the wall with a Deco-Pro valve**

TRV head and sleeve couplings included.

| set 48 | BRUSHED STAINLESS STEEL | € |
|---|---|---|
| | CODE.PW3.PS.1... | 216,40 |

| set 41 | CHROME | € |
|---|---|---|
| | CODE.PW3.DW.1... | 134,20 |
| | CODE.PW3.DC.1... | 143,90 |

*fill in sleeve coupling code*

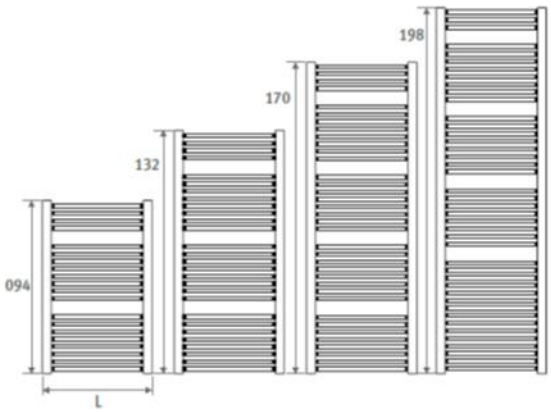
| | |
|---|---|
| Copper 15/1 | 115 |
| Copper 16/1 | 116 |
| Copper 18/1 | 118 |
| RPE/ALU tube 16/2 | 316 |
| RPE/ALU tube 18/2 | 318 |

**Other connection sets and sleeve couplings**

See chapter "Connection sets and valves" for all connection options and technical information.

SANI BASIC

SANI BOW



## CONNECTION SETS

**Connection set to the wall**
**Jaga Danfoss double angled**

TRV head and sleeve couplings included.

set 88 **To the wall** €

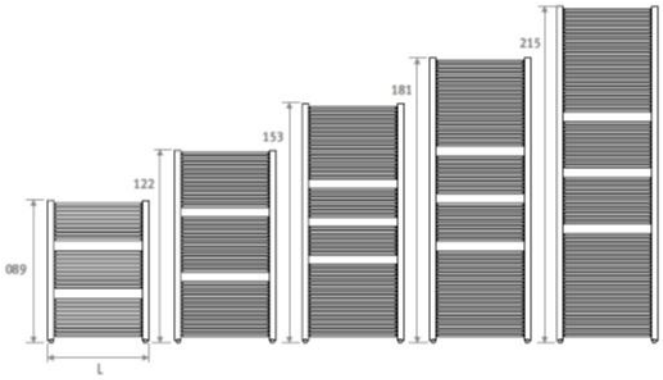
CODE.DHR.CD.1... **150,20**

*fill in sleeve coupling code*

Copper 15/1 **115**
Copper 16/1 **116**
Copper 18/1 **118**
RPE/ALU tube 16/2 **316**
RPE/ALU tube 18/2 **318**

**Other connection sets and sleeve couplings**

See chapter "Connection sets and valves" for all connection options and technical information.




Also available without gaps for towels, see www.theradiatorfactory.com

# ACCOLADE SANI

| code | height | length | colour | conn. |
|---|---|---|---|---|
| ACSW . | 089 | 050 . | XXX | /18 |

*fill in colour code*

| | Watts 75/65 | Watts 55/45 | € st. colour | € other |
|---|---|---|---|---|
| **L** | **H 089** | | | |
| 050 | 502 | 260 | 495,50 | 594,60 |
| 065 | 629 | 325 | 583,10 | 699,70 |
| 080 | 756 | 391 | 608,30 | 730,00 |
| 095 | 883 | 457 | 641,60 | 769,90 |
| **L** | **H 122** | | | |
| 050 | 688 | 355 | 630,40 | 756,50 |
| 065 | 882 | 457 | 671,70 | 806,00 |
| 080 | 1075 | 559 | 713,90 | 856,70 |
| 095 | 1269 | 661 | 755,50 | 906,60 |
| **L** | **H 153** | | | |
| 050 | 827 | 425 | 706,40 | 847,70 |
| 065 | 1065 | 552 | 752,60 | 903,10 |
| 080 | 1303 | 680 | 799,90 | 959,90 |
| 095 | 1542 | 808 | 846,10 | 1015,30 |
| **L** | **H 181** | | | |
| 050 | 982 | 503 | 776,50 | 931,80 |
| 065 | 1263 | 656 | 830,00 | 996,00 |
| 080 | 1545 | 809 | 888,80 | 1066,60 |
| 095 | 1826 | 962 | 947,90 | 1137,50 |
| **L** | **H 215** | | | |
| 050 | 1171 | 598 | 900,60 | 1080,70 |
| 065 | 1494 | 777 | 980,20 | 1176,20 |
| 080 | 1818 | 957 | 1059,20 | 1271,00 |
| 095 | 2141 | 1136 | 1138,40 | 1366,10 |

*EN442 output at 20°C room temperature*

# Annex 10 – Dimensionat per a cobertura solar completa (Criteri desfavorable)

| Captador Unisol Plus | | | | | C0 | C1 | C2 | Ts | S panell | Cp (kJ/kg) | Preu | COP | €/kWh | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0,774 | 3,5 | 0,024 | 60 | 2,07 | 4,18 | 244€ | 2,84 | 0,133 | | |
| CAMP DE CAPTACIÓ | | S capt | 62,88 | Nombre panells | 30,38 | 31 | f anual | 5,28 | | | | | | | |
| | Rad ($MJ/m^2dia$) | Rad ($Wh/m^2dia$) | Dies | Rad ($Wh/m^2mes$) | Hores Sol/dia | I ($W/m^2$) | η capt | PQ (W) | Calef (Wh/mes) | ACS (Wh/mes) | Consum (Wh/mes) | Prod mes (Wh) | Q bomba (Wh) | W bomba (Wh) | Cost (€) |
| Gen | 13,14 | 3650 | 31 | 113150 | 7,5 | 486,67 | 0,257 | 6779 | 1617057 | 209632 | 1826688 | 1864272 | -37584 | -13214 | 0 |
| Feb | 15,32 | 4256 | 28 | 119156 | 8 | 531,94 | 0,308 | 5085 | 1212792 | 185703 | 1398496 | 2353403 | -1140611 | -401037 | 0 |
| Mar | 17,86 | 4961 | 31 | 153794 | 9 | 551,23 | 0,343 | 3434 | 819167 | 197538 | 1016704 | 3388622 | -2569455 | -903416 | 0 |
| Abr | 19,43 | 5397 | 30 | 161917 | 9,5 | 568,13 | 0,385 | 2230 | 531927 | 183363 | 715289 | 3995508 | -3463582 | -1217789 | 0 |
| Mai | 19,87 | 5519 | 31 | 171103 | 9,5 | 580,99 | 0,421 | 89 | 21277 | 185443 | 206720 | 4616950 | -4595673 | -1615830 | 0 |
| Jun | 19,86 | 5517 | 30 | 165500 | 9,5 | 580,70 | 0,457 | 0 | 0 | 175560 | 175560 | 4853597 | -4853597 | -1706516 | 0 |
| Jul | 20 | 5556 | 31 | 172222 | 9,5 | 584,80 | 0,477 | 0 | 0 | 177381 | 177381 | 5267452 | -5267452 | -1852026 | 0 |
| Ago | 20,02 | 5561 | 31 | 172394 | 9,5 | 585,38 | 0,477 | 0 | 0 | 181412 | 181412 | 5275492 | -5275492 | -1854853 | 0 |
| Set | 19,03 | 5286 | 30 | 158583 | 9 | 587,35 | 0,460 | 0 | 0 | 179461 | 179461 | 4681895 | -4681895 | -1646146 | 0 |
| Oct | 16,72 | 4644 | 31 | 143978 | 9 | 516,05 | 0,382 | 223 | 53193 | 189475 | 242667 | 3527994 | -3474802 | -1221734 | 0 |
| Nov | 14,13 | 3925 | 30 | 117750 | 8 | 490,63 | 0,319 | 2498 | 595758 | 191165 | 786923 | 2410150 | -1814392 | -637937 | 0 |
| Des | 12,53 | 3481 | 31 | 107897 | 7 | 497,22 | 0,278 | 5218 | 1244708 | 209632 | 1454340 | 1928082 | -683374 | -240273 | 0 |
| | | | | | | | | | | | | | | | |
| Sum | 208 | 57753 | 365 | 1757444 | 105 | 6561 | 5 | 25557 | 6095878 | 2265764 | 8361642 | 44163419 | -37857909 | | 0 |
| Mitj | 17,33 | 4812,73 | 30,42 | 146453,70 | 8,75 | 546,76 | 0,38 | 2129,73 | 507989,82 | 188813 | 696803 | 3680284 | -3154825 | | |

# Annex 11 – Dimensionat per a cobertura solar majoritària (Criteri 3 més freds)

| Captador Unisol Plus | | | | | C0 | C1 | C2 | Ts | S panell | Cp (kJ/kg) | Preu | COP | €/kWh | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0,774 | 3,5 | 0,024 | 60 | 2,07 | 4,18 | 244€ | 2,84 | 0,133 | | |
| CAMP DE CAPTACIÓ | | S capt | 48,95 | Nombre panells | 23,65 | 24 | f anual | 4,09 | | | | | | | |
| | Rad (MJ/m$^2$dia) | Rad (Wh/m$^2$dia) | Dies | Rad (Wh/m$^2$mes) | Hores Sol/dia | I (W/m$^2$) | η capt | PQ (W) | Calef (Wh/mes) | ACS (Wh/mes) | Consum (Wh/mes) | Prod mes (Wh) | Q bomba (Wh) | W bomba (Wh) | Cost (€) |
| Gen | 13,14 | 3650 | 31 | 113150 | 7,5 | 486,67 | 0,257 | 6779 | 1617057 | 209632 | 1826688 | 1443308 | 383381 | 134796 | 18 |
| Feb | 15,32 | 4256 | 28 | 119156 | 8 | 531,94 | 0,308 | 5085 | 1212792 | 185703 | 1398496 | 1821990 | -609197 | -214193 | 0 |
| Mar | 17,86 | 4961 | 31 | 153794 | 9 | 551,23 | 0,343 | 3434 | 819167 | 197538 | 1016704 | 2623449 | -1804282 | -634382 | 0 |
| Abr | 19,43 | 5397 | 30 | 161917 | 9,5 | 568,13 | 0,385 | 2230 | 531927 | 183363 | 715289 | 3093297 | -2561370 | -900573 | 0 |
| Mai | 19,87 | 5519 | 31 | 171103 | 9,5 | 580,99 | 0,421 | 89 | 21277 | 185443 | 206720 | 3574413 | -3553136 | -1249276 | 0 |
| Jun | 19,86 | 5517 | 30 | 165500 | 9,5 | 580,70 | 0,457 | 0 | 0 | 175560 | 175560 | 3757623 | -3757623 | -1321173 | 0 |
| Jul | 20 | 5556 | 31 | 172222 | 9,5 | 584,80 | 0,477 | 0 | 0 | 177381 | 177381 | 4078027 | -4078027 | -1433827 | 0 |
| Ago | 20,02 | 5561 | 31 | 172394 | 9,5 | 585,38 | 0,477 | 0 | 0 | 181412 | 181412 | 4084252 | -4084252 | -1436016 | 0 |
| Set | 19,03 | 5286 | 30 | 158583 | 9 | 587,35 | 0,460 | 0 | 0 | 179461 | 179461 | 3624693 | -3624693 | -1274435 | 0 |
| Oct | 16,72 | 4644 | 31 | 143978 | 9 | 516,05 | 0,382 | 223 | 53193 | 189475 | 242667 | 2731350 | -2678158 | -941635 | 0 |
| Nov | 14,13 | 3925 | 30 | 117750 | 8 | 490,63 | 0,319 | 2498 | 595758 | 191165 | 786923 | 1865923 | -1270165 | -446588 | 0 |
| Des | 12,53 | 3481 | 31 | 107897 | 7 | 497,22 | 0,278 | 5218 | 1244708 | 209632 | 1454340 | 1492709 | -248001 | -87197 | 0 |
| | | | | | | | | | | | | | | | |
| Sum | 208 | 57753 | 365 | 1757444 | 105 | 6561 | 5 | 25557 | 6095878 | 2265764 | 8361642 | 34191034 | -27885524 | | 18 |
| Mitj | 17,33 | 4812,73 | 30,42 | 146453,70 | 8,75 | 546,76 | 0,38 | 2129,73 | 507989,82 | 188813 | 696803 | 2849252 | -2323793 | | |

# Annex 12 – Dimensionat per a cobertura solar variable (Variable 0,75)

| Captador Unisol Plus | | | | | C0 | C1 | C2 | Ts | S panell | Cp (kJ/kg) | Preu | COP | €/kWh | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0,774 | 3,5 | 0,024 | 60 | 2,07 | 4,18 | 244€ | 2,84 | 0,133 | | |
| **CAMP DE CAPTACIÓ** | | **S capt** | **36,71** | **Nombre panells** | **17,74** | **18** | **f anual** | **3,07** | | | | | | | |
| | **Rad (MJ/m²dia)** | **Rad (Wh/m²dia)** | **Dies** | **Rad (Wh/m²mes)** | **Hores Sol/dia** | **I (W/m²)** | **η capt** | **PQ (W)** | **Calef (Wh/mes)** | **ACS (Wh/mes)** | **Consum (Wh/mes)** | **Prod mes (Wh)** | **Q bomba (Wh)** | **W bomba (Wh)** | **Cost (€)** |
| Gen | 13,14 | 3650 | 31 | 113150 | 7,5 | 486,67 | 0,257 | 6779 | 1617057 | 209632 | 1826688 | 1082481 | 744208 | 261662 | 35 |
| Feb | 15,32 | 4256 | 28 | 119156 | 8 | 531,94 | 0,308 | 5085 | 1212792 | 185703 | 1398496 | 1366492 | -153700 | -54041 | 0 |
| Mar | 17,86 | 4961 | 31 | 153794 | 9 | 551,23 | 0,343 | 3434 | 819167 | 197538 | 1016704 | 1967587 | -1148420 | -403782 | 0 |
| Abr | 19,43 | 5397 | 30 | 161917 | 9,5 | 568,13 | 0,385 | 2230 | 531927 | 183363 | 715289 | 2319973 | -1788046 | -628674 | 0 |
| Mai | 19,87 | 5519 | 31 | 171103 | 9,5 | 580,99 | 0,421 | 89 | 21277 | 185443 | 206720 | 2680810 | -2659533 | -935087 | 0 |
| Jun | 19,86 | 5517 | 30 | 165500 | 9,5 | 580,70 | 0,457 | 0 | 0 | 175560 | 175560 | 2818217 | -2818217 | -990880 | 0 |
| Jul | 20 | 5556 | 31 | 172222 | 9,5 | 584,80 | 0,477 | 0 | 0 | 177381 | 177381 | 3058520 | -3058520 | -1075370 | 0 |
| Ago | 20,02 | 5561 | 31 | 172394 | 9,5 | 585,38 | 0,477 | 0 | 0 | 181412 | 181412 | 3063189 | -3063189 | -1077012 | 0 |
| Set | 19,03 | 5286 | 30 | 158583 | 9 | 587,35 | 0,460 | 0 | 0 | 179461 | 179461 | 2718520 | -2718520 | -955827 | 0 |
| Oct | 16,72 | 4644 | 31 | 143978 | 9 | 516,05 | 0,382 | 223 | 53193 | 189475 | 242667 | 2048513 | -1995320 | -701551 | 0 |
| Nov | 14,13 | 3925 | 30 | 117750 | 8 | 490,63 | 0,319 | 2498 | 595758 | 191165 | 786923 | 1399442 | -803684 | -282574 | 0 |
| Des | 12,53 | 3481 | 31 | 107897 | 7 | 497,22 | 0,278 | 5218 | 1244708 | 209632 | 1454340 | 1119532 | 125177 | 44012 | 6 |
| | | | | | | | | | | | | | | | |
| Sum | 208 | 57753 | 365 | 1757444 | 105 | 6561 | 5 | 25557 | 6095878 | 2265764 | 8361642 | 25643275 | -19337766 | | 41 |
| Mitj | 17,33 | 4812,73 | 30,42 | 146453,70 | 8,75 | 546,76 | 0,38 | 2129,73 | 507989,82 | 188813 | 696803 | 2136939 | -1611480 | | |

# Annex 13 – Dimensionat per a cobertura solar variable (Variable 0,5)

| Captador Unisol Plus | | | | | C0 | C1 | C2 | Ts | S panell | Cp (kJ/kg) | Preu | COP | €/kWh | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0,774 | 3,5 | 0,024 | 60 | 2,07 | 4,18 | 244€ | 2,84 | 0,133 | | |
| CAMP DE CAPTACIÓ | | S capt | 24,47 | Nombre panells | 11,82 | 12 | f anual | 2,04 | | | | | | | |
| | Rad ($MJ/m^2dia$) | Rad ($Wh/m^2dia$) | Dies | Rad ($Wh/m^2mes$) | Hores Sol/dia | I ($W/m^2$) | η capt | PQ (W) | Calef (Wh/mes) | ACS (Wh/mes) | Consum (Wh/mes) | Prod mes (Wh) | Q bomba (Wh) | W bomba (Wh) | Cost (€) |
| Gen | 13,14 | 3650 | 31 | 113150 | 7,5 | 486,67 | 0,257 | 6779 | 1617057 | 209632 | 1826688 | 721654 | 1105034 | 388528 | 52 |
| Feb | 15,32 | 4256 | 28 | 119156 | 8 | 531,94 | 0,308 | 5085 | 1212792 | 185703 | 1398496 | 910995 | 301798 | 106111 | 14 |
| Mar | 17,86 | 4961 | 31 | 153794 | 9 | 551,23 | 0,343 | 3434 | 819167 | 197538 | 1016704 | 1311725 | -492558 | -173182 | 0 |
| Abr | 19,43 | 5397 | 30 | 161917 | 9,5 | 568,13 | 0,385 | 2230 | 531927 | 183363 | 715289 | 1546648 | -1014722 | -356774 | 0 |
| Mai | 19,87 | 5519 | 31 | 171103 | 9,5 | 580,99 | 0,421 | 89 | 21277 | 185443 | 206720 | 1787207 | -1765930 | -620898 | 0 |
| Jun | 19,86 | 5517 | 30 | 165500 | 9,5 | 580,70 | 0,457 | 0 | 0 | 175560 | 175560 | 1878812 | -1878812 | -660587 | 0 |
| Jul | 20 | 5556 | 31 | 172222 | 9,5 | 584,80 | 0,477 | 0 | 0 | 177381 | 177381 | 2039014 | -2039014 | -716913 | 0 |
| Ago | 20,02 | 5561 | 31 | 172394 | 9,5 | 585,38 | 0,477 | 0 | 0 | 181412 | 181412 | 2042126 | -2042126 | -718008 | 0 |
| Set | 19,03 | 5286 | 30 | 158583 | 9 | 587,35 | 0,460 | 0 | 0 | 179461 | 179461 | 1812347 | -1812347 | -637218 | 0 |
| Oct | 16,72 | 4644 | 31 | 143978 | 9 | 516,05 | 0,382 | 223 | 53193 | 189475 | 242667 | 1365675 | -1312483 | -461466 | 0 |
| Nov | 14,13 | 3925 | 30 | 117750 | 8 | 490,63 | 0,319 | 2498 | 595758 | 191165 | 786923 | 932961 | -337204 | -118560 | 0 |
| Des | 12,53 | 3481 | 31 | 107897 | 7 | 497,22 | 0,278 | 5218 | 1244708 | 209632 | 1454340 | 746354 | 498354 | 175220 | 23 |
| | | | | | | | | | | | | | | | |
| Sum | 208 | 57753 | 365 | 1757444 | 105 | 6561 | 5 | 25557 | 6095878 | 2265764 | 8361642 | 17095517 | -10790007 | | 89 |
| Mitj | 17,33 | 4812,73 | 30,42 | 146453,70 | 8,75 | 546,76 | 0,38 | 2129,73 | 507989,82 | 188813 | 696803 | 1424626 | -899167 | | |

# Annex 14 – Dimensionat per a cobertura solar variable (Variable 0,25)

| Captador Unisol Plus | | | | | C0 | C1 | C2 | Ts | S panell | Cp (kJ/kg) | Preu | COP | €/kWh | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0,774 | 3,5 | 0,024 | 60 | 2,07 | 4,18 | 244€ | 2,84 | 0,133 | | |
| CAMP DE CAPTACIÓ | | S capt | 12,24 | Nombre panells | 5,91 | 6 | f anual | 1,02 | | | | | | | |
| | Rad (MJ/m$^2$dia) | Rad (Wh/m$^2$dia) | Dies | Rad (Wh/m$^2$mes) | Hores Sol/dia | I (W/m$^2$) | η capt | PQ (W) | Calef (Wh/mes) | ACS (Wh/mes) | Consum (Wh/mes) | Prod mes (Wh) | Q bomba (Wh) | W bomba (Wh) | Cost (€) |
| Gen | 13,14 | 3650 | 31 | 113150 | 7,5 | 486,67 | 0,257 | 6779 | 1617057 | 209632 | 1826688 | 360827 | 1465861 | 515394 | 69 |
| Feb | 15,32 | 4256 | 28 | 119156 | 8 | 531,94 | 0,308 | 5085 | 1212792 | 185703 | 1398496 | 455497 | 757295 | 266264 | 35 |
| Mar | 17,86 | 4961 | 31 | 153794 | 9 | 551,23 | 0,343 | 3434 | 819167 | 197538 | 1016704 | 655862 | 163305 | 57418 | 8 |
| Abr | 19,43 | 5397 | 30 | 161917 | 9,5 | 568,13 | 0,385 | 2230 | 531927 | 183363 | 715289 | 773324 | -241398 | -84875 | 0 |
| Mai | 19,87 | 5519 | 31 | 171103 | 9,5 | 580,99 | 0,421 | 89 | 21277 | 185443 | 206720 | 893603 | -872326 | -306708 | 0 |
| Jun | 19,86 | 5517 | 30 | 165500 | 9,5 | 580,70 | 0,457 | 0 | 0 | 175560 | 175560 | 939406 | -939406 | -330293 | 0 |
| Jul | 20 | 5556 | 31 | 172222 | 9,5 | 584,80 | 0,477 | 0 | 0 | 177381 | 177381 | 1019507 | -1019507 | -358457 | 0 |
| Ago | 20,02 | 5561 | 31 | 172394 | 9,5 | 585,38 | 0,477 | 0 | 0 | 181412 | 181412 | 1021063 | -1021063 | -359004 | 0 |
| Set | 19,03 | 5286 | 30 | 158583 | 9 | 587,35 | 0,460 | 0 | 0 | 179461 | 179461 | 906173 | -906173 | -318609 | 0 |
| Oct | 16,72 | 4644 | 31 | 143978 | 9 | 516,05 | 0,382 | 223 | 53193 | 189475 | 242667 | 682838 | -629645 | -221382 | 0 |
| Nov | 14,13 | 3925 | 30 | 117750 | 8 | 490,63 | 0,319 | 2498 | 595758 | 191165 | 786923 | 466481 | 129277 | 45454 | 6 |
| Des | 12,53 | 3481 | 31 | 107897 | 7 | 497,22 | 0,278 | 5218 | 1244708 | 209632 | 1454340 | 373177 | 871531 | 306429 | 41 |
| | | | | | | | | | | | | | | | |
| Sum | 208 | 57753 | 365 | 1757444 | 105 | 6561 | 5 | 25557 | 6095878 | 2265764 | 8361642 | 8547758 | -2242249 | | 158 |
| Mitj | 17,33 | 4812,73 | 30,42 | 146453,70 | 8,75 | 546,76 | 0,38 | 2129,73 | 507989,82 | 188813 | 696803 | 712313 | -186854 | | |

# Annex 15 – Dimensionat per a cobertura solar variable (Variable 0,1)

| Captador Unisol Plus | | | | | C0 | C1 | C2 | Ts | S panell | Cp (kJ/kg) | Preu | COP | €/kWh | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0,774 | 3,5 | 0,024 | 60 | 2,07 | 4,18 | 244€ | 2,84 | 0,133 | | |
| CAMP DE CAPTACIÓ | | S capt | 4,89 | Nombre panells | 2,36 | 3 | f anual | 0,51 | | | | | | | |
| | Rad (MJ/m$^2$dia) | Rad (Wh/m$^2$dia) | Dies | Rad (Wh/m$^2$mes) | Hores Sol/dia | I (W/m$^2$) | η capt | PQ (W) | Calef (Wh/mes) | ACS (Wh/mes) | Consum (Wh/mes) | Prod mes (Wh) | Q bomba (Wh) | W bomba (Wh) | Cost (€) |
| Gen | 13,14 | 3650 | 31 | 113150 | 7,5 | 486,67 | 0,257 | 6779 | 1617057 | 209632 | 1826688 | 180413 | 1646275 | 578827 | 77 |
| Feb | 15,32 | 4256 | 28 | 119156 | 8 | 531,94 | 0,308 | 5085 | 1212792 | 185703 | 1398496 | 227749 | 985044 | 346340 | 46 |
| Mar | 17,86 | 4961 | 31 | 153794 | 9 | 551,23 | 0,343 | 3434 | 819167 | 197538 | 1016704 | 327931 | 491236 | 172718 | 23 |
| Abr | 19,43 | 5397 | 30 | 161917 | 9,5 | 568,13 | 0,385 | 2230 | 531927 | 183363 | 715289 | 386662 | 145264 | 51075 | 7 |
| Mai | 19,87 | 5519 | 31 | 171103 | 9,5 | 580,99 | 0,421 | 89 | 21277 | 185443 | 206720 | 446802 | -425525 | -149614 | 0 |
| Jun | 19,86 | 5517 | 30 | 165500 | 9,5 | 580,70 | 0,457 | 0 | 0 | 175560 | 175560 | 469703 | -469703 | -165147 | 0 |
| Jul | 20 | 5556 | 31 | 172222 | 9,5 | 584,80 | 0,477 | 0 | 0 | 177381 | 177381 | 509753 | -509753 | -179228 | 0 |
| Ago | 20,02 | 5561 | 31 | 172394 | 9,5 | 585,38 | 0,477 | 0 | 0 | 181412 | 181412 | 510532 | -510532 | -179502 | 0 |
| Set | 19,03 | 5286 | 30 | 158583 | 9 | 587,35 | 0,460 | 0 | 0 | 179461 | 179461 | 453087 | -453087 | -159304 | 0 |
| Oct | 16,72 | 4644 | 31 | 143978 | 9 | 516,05 | 0,382 | 223 | 53193 | 189475 | 242667 | 341419 | -288226 | -101340 | 0 |
| Nov | 14,13 | 3925 | 30 | 117750 | 8 | 490,63 | 0,319 | 2498 | 595758 | 191165 | 786923 | 233240 | 362517 | 127460 | 17 |
| Des | 12,53 | 3481 | 31 | 107897 | 7 | 497,22 | 0,278 | 5218 | 1244708 | 209632 | 1454340 | 186589 | 1058119 | 372033 | 49 |
| | | | | | | | | | | | | | | | |
| Sum | 208 | 57753 | 365 | 1757444 | 105 | 6561 | 5 | 25557 | 6095878 | 2265764 | 8361642 | 4273879 | 2031630 | | 219 |
| Mitj | 17,33 | 4812,73 | 30,42 | 146453,70 | 8,75 | 546,76 | 0,38 | 2129,73 | 507989,82 | 188813 | 696803 | 356156 | 169302 | | |

# Annex 16 – Càlcul d'integració fotovoltaica

| Captador Atersa A-285P | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| η | Imp | Vmp | Icc | Voc | A | | | | | | | |
| 14,65% | 8 | 35,63 | 8,56 | 44,52 | 1,95 | | | | | | | |
| | | | | | | | | | | | | |
| CALEFACCIÓ PER EFECTE JOULE | | | | | | | | | | | | |
| DE | Wp | hsp | n | n real | PQ | V treball | c20 | | | | | |
| 86938,53 | 285 | 3,65 | 83,57 | 84 | 5016,96 | 120 | 2716,83 | | | | | |
| | | | | | | | | | | | | |
| CALEFACCIÓ AMB BOMBA DE CALOR AIRE-AIRE | | | | | | | | | | | | |
| DE | Wp | hsp | n | n real | Pot | V treball | Icc | Ir | Ir max | n reg | c20 | c120 |
| 15531,54 | 285 | 3,65 | 14,93 | 16 | 2670,00 | 48 | 68,48 | 85,6 | 30 | 3 | 1213,40 | 1554,671 |
| | | | | | | | | | | | | |
| REFRIGERACIÓ AMB BOMBA DE CALOR AIRE-AIRE | | | | | | | | | | | | |
| DE | Wp | hsp | n | n real | Pot | V treball | Icc | Ir | Ir max | n reg | c20 | c120 |
| 19037,66 | 285 | 5,56 | 12,01 | 12 | 1700,00 | 48 | 51,36 | 64,2 | 30 | 3 | 1487,32 | 1905,625 |
| | | | | | | | | | | | | |
| CLIMATITZACIÓ AMB BOMBA I EQUIP DE SUPORT | | | | | | | | | | | | |
| DE | Wp | hsp | n | n real | Pot | V treball | Icc | Ir | Ir max | n reg | c20 | c120 |
| 41639,56 | 285 | 3,65 | 40,03 | 40 | 3462,49 | 120 | 68,48 | 85,6 | 35 | 3 | 1301,24 | 1667,209 |

# Annex 17 – Característiques del panell solar fotovoltaic

Nueva gama Ultra con Tolerancia positiva

## Características eléctricas (STC: 1kW/m², 25ºC±2ºC y AM 1,5)*

| | A-280P | A-285P |
|---|---|---|
| Potencia Nominal (0/+5 W) | 280 W | 285 W |
| Eficiencia del módulo | 14,39% | 14,65% |
| Corriente Punto de Máxima Potencia (Imp) | 7,93 A | 8,00 A |
| Tensión Punto de Máxima Potencia (Vmp) | 35,33 V | 35,63 V |
| Corriente en Cortocircuito (Isc) | 8,45 A | 8,56 A |
| Tensión de Circuito Abierto (Voc) | 44,37 V | 44,52 V |

## Parámetros térmicos

| | |
|---|---|
| Coeficiente de Temperatura de Isc (α) | 0,04% /ºC |
| Coeficiente de Temperatura de Voc (β) | -0,32% /ºC |
| Coeficiente de Temperatura de P (γ) | -0,43% /ºC |

## Características físicas

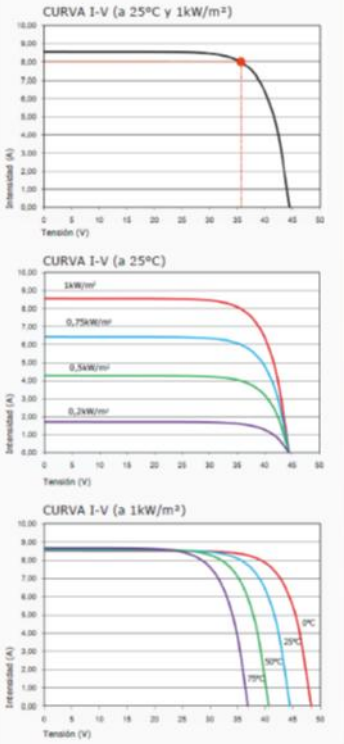
| | |
|---|---|
| Dimensiones (mm ± 2 mm) | 1965x990x40 |
| Peso (kg) | 24 |
| Área (m²) | 1,95 |
| Tipo de célula | Policristalina 156x156 mm (6 pulgadas) |
| Células en serie | 72 (6x12) |
| Cristal delantero | Cristal templado ultra claro de 4 mm |
| Marco | Aleación de aluminio pintado en poliéster |
| Caja de conexiones / Opcional | QUAD IP54 / QUAD IP65 |
| Cables | Cable Solar 4 mm² 1250 mm |
| Conectores | MC4 o combinable MC4 |

## Rango de funcionamiento

| | |
|---|---|
| Temperatura | -40ºC a +85ºC |
| Máxima Tensión del Sistema / Protección | 1000 V / CLASS II |
| Carga Máxima Viento / Nieve | 2400 Pa (130 km/h) / 5400 Pa (551 kg/m²) |
| Máxima Corriente Inversa (IR) | 15,1 A |

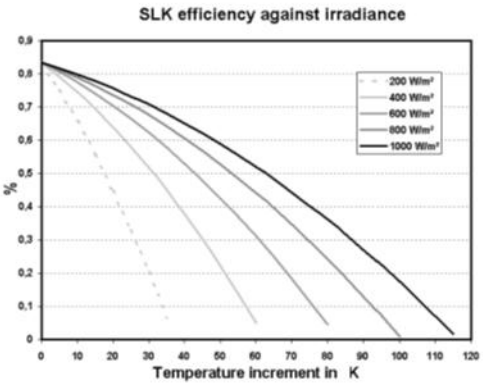
*Especificaciones eléctricas medidas en STC. NOCT: 47±2ºC.
Tolerancias medida STC: ±3% (Pmp); ±10% (Isc, Voc, Imp, Vmp).

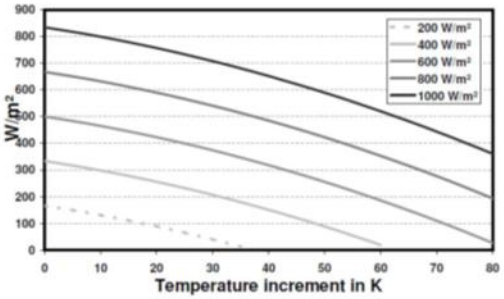
## Curvas modelo A-285P

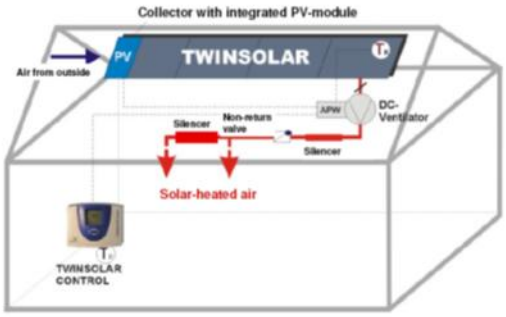


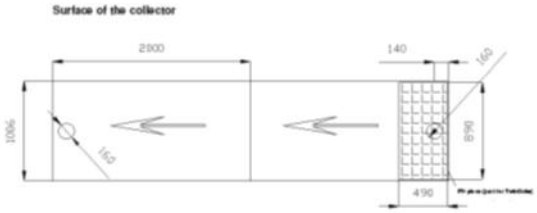
# Annex 18 – Dades tècniques de panells solars d'aire

| SLK collector characteristic values (all data are referred to aperture surface) | | | |
|---|---|---|---|
| **Magnitude** | **Symbol** | **Unit** | **Certified value** |
| Conversion factor at temperature difference $(t_m - t_a) = 0$ | $\eta_0$ | | 0,834 |
| Linear loss coefficient | $A_1$ | W/(m² x K) | 3,197 |
| Squared loss coefficient | $A_2$ | W/(m² x K²) | 0,034 |
| Angle factor | $K_\theta(50°)$ | | 0,96 |
| Recommended flow range | | m³/(h x m²) | 30 to 60 |
| **Reference surface** | | | |
| Gross surface | $A_G$ | m² | 2,01 |
| Aperture surface | $A_a$ | m² | 1,86 |
| Operational limit | | °C | 150°C |
| | | | |
| **Installation** | | | |
| Forms of Installation | On inclined roof, on flat roof, façade mounted: | | |




| | TWIN 4.0 - 6.0 | TWIN 8.0 - 14.0 | TOP 4.0 – 6.0 | TOP 8.0 – 10.0 | TOP 12.0 – 20.0 |
|---|---|---|---|---|---|
| **Ventilator type** | G1G120 | G1G140 | HE-160B | HE-160C | HE-200B |
| **Nominal power** | 50W | 100W | 69W | 100W | 115W |
| **Position** | External; DC | External; DC | External; AC | External; AC | External; AC |
| **Max. flow rate*** | 200 m³/h | 350 m³/h | 200 m³/h | 350 m³/h | 380 m³/h |
| **Control** | TwinSolar Control | TwinSolar Control | Delta Sol II | Delta Sol II | Delta Sol II |

*Flowrate for collector systems with 150Pa external fit
As to the Twinsolar the flowrate is dependant on irradiation